UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/508,881	04/26/2005	Nicolas Zartenar	1943-045073	3732

28289 7590 06/20/2008

THE WEBB LAW FIRM, P.C.
700 KOPPERS BUILDING
436 SEVENTH AVENUE
PITTSBURGH, PA 15219

EXAMINER	
YOUNG, NATASHA E	
ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
06/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/508,881	ZARTENAR ET AL.	
	Examiner	Art Unit	
	NATASHA YOUNG	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 27, 2008 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 22-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (EP 0 913 357 A1) in view of Kaneko (JP 08-208202).

Regarding claim 22, Abe discloses a device for the generation of hydrogen (see Abstract), comprising: a. a heated steam reformation stage with a reformer catalyst for converting gaseous or vaporizable hydrocarbons and water into hydrogen, carbon monoxide and further reformation products, wherein the steam reformation stage is embodied as a hollow body, with a shell chamber embodied as an chamber for housing a reformer catalyst, and a heating device that is arranged in the shell chamber; b. at least one stage that is arranged downstream of the steam reformation stage for catalytic conversion of the mixture of hydrogen, carbon monoxide, and excess water steam (shift step) emanating from the steam reformation stage, wherein the conversion stages are embodied as a hollow body with an chamber for housing a corresponding catalyst; and c. a fine purification stage that is arranged downstream of the conversion stages for catalytic reduction of the residual carbon monoxide content of the conversion products,

wherein the fine purification stage is embodied as a hollow body with an chamber for housing the corresponding catalyst, and wherein the chamber of the fine purification stage directly connects to the chamber of the conversion stage on the fine purification stage side, wherein the chamber of the conversion stage on the steam reformation stage side directly connects to the chamber of the steam reformation stage to form a complete chamber of all the stages (see Abstract; page 2, lines 13-33 and lines 39-54; page 3, lines 17-24; and figures 2-4).

Abe does not disclose an annular chamber and the device wherein the annular chamber of the conversion stage on the steam reformation stage side directly connects to the annular chamber of the steam reformation stage to form a complete annular chamber of all the stages, wherein the stages are located inline with respect to one another, and wherein there are no separate feed lines, discharge lines, or bypass devices between the individual stages.

Kaneko discloses a fuel reformer comprising a catalyst layer (3) and reforming pipes (8) and the catalyst layer (3) is arranged in an internal annular space (86) formed between the reforming pipes (8) (see Abstract and figures 1, 3, and 5) such that a complete annular chamber of all the stages, wherein the stages are located inline with respect to one another, and wherein there are no separate feed lines, discharge lines, or bypass devices between the individual stages; and a device for the generation of hydrogen, comprising. a heated steam reformation stage with a reformer catalyst for converting gaseous or vaporizable hydrocarbons and water into hydrogen, carbon monoxide and further reformation products, wherein the steam reformation stage is

embodied as a hollow body, with a shell chamber embodied as an annular chamber for housing a reformer catalyst, and a heating device that is arranged in the shell chamber and at least one stage that is arranged downstream of the steam reformation stage for catalytic conversion of the mixture of hydrogen, carbon monoxide, and excess water steam (shift step) emanating from the steam reformation stage, wherein the conversion stages are embodied as a hollow body with an annular chamber for housing a corresponding catalyst (see paragraphs 0005-0009) which discloses refining of the material gas (9a) heated with the heat carrier (51) to produce reformed gas (b) rich in hydrogen by the reforming action of the catalyst which is heated by the heat carrier (51), when using the reformed gas (9b) for a fuel cell power plant the reformed gas (9b) is sent to a carbon monoxide shift converter and the carbon monoxide concentration is reduced by carrying out conduction, which is carried out in the reformer (9) (see paragraph 0016).

The above combination of familiar elements, such as a reformer having a complete annular chamber of all the stages, wherein the stages are located inline with respect to one another, and wherein there are no separate feed lines, discharge lines, or bypass devices between the individual stages having a. a heated steam reformation stage with a reformer catalyst for converting gaseous or vaporizable hydrocarbons and water into hydrogen, carbon monoxide and further reformation products, wherein the steam reformation stage is embodied as a hollow body, with a shell chamber embodied as an annular chamber for housing a reformer catalyst, and a heating device that is arranged in the shell chamber; b. at least one stage that is arranged downstream of the

steam reformation stage for catalytic conversion of the mixture of hydrogen, carbon monoxide, and excess water steam (shift step) emanating from the steam reformation stage, wherein the conversion stages are embodied as a hollow body with an annular chamber for housing a corresponding catalyst; and c. a fine purification stage that is arranged downstream of the conversion stages for catalytic reduction of the residual carbon monoxide content of the conversion products, wherein the fine purification stage is embodied as a hollow body with an annular chamber for housing the corresponding catalyst, and wherein the annular chamber of the fine purification stage directly connects to the annular chamber of the conversion stage on the fine purification stage side, according to Abe et al and Kaneko yields the predictable result of a reformer capable of reducing the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

Claims 23-25 depend on claim 22 such that the reasoning used to reject claim 22 will be used to reject the dependent portions of the claims.

Regarding claim 23, Abe discloses the heating device is embodied as a burner (see page 6, line 17-19).

Regarding claim 24, Abe does not disclose the cross sectional thickness of the complete annular chamber is approximately 2 to 20% of the exterior diameter of the hollow body.

Kaneko discloses a fuel reformer comprising a catalyst layer (3) and reforming pipes (8) and the catalyst layer (3) is arranged in an internal annular space (86) formed between the reforming pipes (8) (see Abstract and figures 1, 3, and 5) such that a

complete annular chamber of all the stages, wherein the stages are located inline with respect to one another, and wherein there are no separate feed lines, discharge lines, or bypass devices between the individual stages.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Abe with the teachings of Kaneko et al to reduce the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the annular chamber to a thickness in the approximate range of 2 to 20% of the hollow body, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (see MPEP 2144.05 (II-A)).

Regarding claim 25, Abe teaches the catalyst is arranged in a honeycomb structure, preferably arranged on a flow channel limiting corrugated metal foil (see Abstract and page 10, lines 28-29).

Kaneko discloses the flow channel represents an annular chamber (see figures 1, 3, and 5).

The above combination of familiar elements, such as a device wherein the flow channel represents an annular chamber, according to Abe et al and Kaneko yields the predictable result of a reformer capable of reducing the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

It would have been an obvious matter of design choice to have the catalyst is arranged in at least one of the annular chambers in a honeycomb structure, preferably arranged on a flow channel limiting corrugated metal foil, since applicant has not disclosed that an annular catalytic honeycomb structure solves any stated problem or is for any particular purpose and it appears that the invention would perform well with an annular catalytic honeycomb structure.

Claim 26 depends on claim 25 such that the reasoning used to reject claim 25 will be used to reject the dependent portions of the claim.

Regarding claim 26, Abe teaches perforations are provided between the flow channels for improving the material exchange (see page 6, lines 2-7 and page 9, lines 1-7).

Claims 27-28 depend on claim 22 such that the reasoning used to reject claim 22 will be used to reject the dependent portions of the claims.

Regarding claim 27, Abe discloses at least one flow channel is provided in the interior of the hollow body (bodies) (see figure 4).

Regarding claim 28, Abe discloses the main direction of flow of hydrogen and of the reformer products within the hollow body is preferably essentially oriented parallel to its axis (see figure 4).

Claim 29 depends on claim 28 such that the reasoning used to reject claim 28 will be used to reject the dependent portions of the claim.

Regarding claim 29, Abe does not disclose a device wherein the flow channel represents an annular chamber.

Kaneko discloses the flow channel represents an annular chamber (see figures 1, 3, and 5).

The above combination of familiar elements, such as a device wherein the flow channel represents an annular chamber, according to Abe et al and Kaneko yields the predictable result of a reformer capable of reducing the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

Claims 30-32 depend on claim 22 such that the reasoning used to reject claim 22 will be used to reject the dependent portions of the claims.

Regarding claim 30, Abe does not disclose a device wherein the flow channel is embodied for feeding and preheating the hydrocarbons in the opposite direction of the flow of the gaseous products coming from the conversion stages and the fine purification stage.

Abe discloses preheating the hydrocarbons and the conversion stages and the purification stage (see page 5, lines 2-11 and figure 4).

Kaneko discloses a device wherein the flow channel is embodied for feeding and preheating the hydrocarbons in the opposite direction of the flow of the gaseous products coming from the conversion stages (see paragraphs 005-0009 and figures 1, 3, and 5).

The above combination of familiar elements, such as a device wherein the flow channel is embodied for feeding and preheating the hydrocarbons in the opposite direction of the flow of the gaseous products coming from the conversion stages and the fine purification stage, according to Abe et al and Kaneko yields the predictable result of

a reformer capable of reducing the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

Regarding claim 31, Abe discloses an indirect heat exchanger is provided at least between the conversion stages and the steam reformation stage, and possibly also between the conversion stage and the fine purification stage, through which the water required for the steam reformation is guided in counter flow of the gaseous products coming from the conversion stages and possibly also from the fine purification stage (see page 7, lines 20-33 and figure 9).

Regarding claim 32, Abe discloses the fine purification stage is embodied optionally as a selective oxidation stage (SelOx stage), or as a methanation stage (see page 5, lines 2-11).

Claim 33 depends on claim 32 such that the reasoning used to reject claim 32 will be used to reject the dependent portions of the claim.

Regarding claim 33, Abe does not disclose an air supply that is evenly arranged across the circumference of the annular chamber of the fine purification stage.

Kaneko discloses the flow channel represents an annular chamber (see figures 1, 3, and 5).

The above combination of familiar elements, such as a device wherein the flow channel represents an annular chamber, according to Abe et al and Kaneko yields the predictable result of a reformer capable of reducing the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to equip the SelOx stage of the annular chamber with an air supply since it would lead to improved purification results.

Claim 34 depends on claim 33 such that the reasoning used to reject claim 33 will be used to reject the dependent portions of the claim.

Abe does not disclose the air supply is embodied as an annular manifold with distributed discharge nozzles.

Kaneko discloses the flow channel represents an annular chamber (see figures 1, 3, and 5).

The above combination of familiar elements, such as a device wherein the flow channel represents an annular chamber, according to Abe et al and Kaneko yields the predictable result of a reformer capable of reducing the collapse of granular reforming catalyst resulting from heat modification (see Kaneko paragraph 0014).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to embody the air supply as an annular manifold with distributed discharge nozzles, since it has been held that the provision of adjustability, where needed, involves routine skill in the art (see MPEP (V-D)).

Claim 35 depends on claim 22 such that the reasoning used to reject claim 22 will be used to reject the dependent portions of the claim.

Regarding claim 35, Abe teaches a flow guide enclosure that envelopes the conversion stages from the exterior, for a cooling medium for the cooling of the conversion stages, wherein the cooling medium preferably is water or hydrocarbons,

which can be fed to the steam reformation stage in the form of steam (see page 7, lines 20-33).

Although Abe teaches a heating medium, it is known to one having ordinary skill in the art at the time the invention was made that heat exchangers are used for heating and cooling a fluid.

Claims 36-38 depend on claim 35 such that the reasoning used to reject claim 35 will be used to reject the dependent portions of the claims.

Regarding claim 36, Abe discloses the flow guide enclosure contains input and output connections for the cooling medium, and is optionally designed in the equal or counter flow of the through flow direction within the conversion stages (see page 7, lines 30-33 and figure 9).

Regarding claim 37, Abe discloses that the flow guide enclosure is connected on the discharge connection side to the reformation stage (see figure 9).

Abe does not disclose that the flow guide enclosure is hydraulically connected on the discharge connection side to the reformation stage.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to hydraulically connect the flow guide enclosure on the discharge connection side to the reformation stage, since it has been held that constructing a formerly integral, structure in various elements involves only routine skill in the art (see MPEP 2144.04 (V-C).

Regarding claim 38, Abe does not disclose a control valve is provided as an option at the input and/or output connections of the flow guide enclosure for the mass adjustment of the flow of the cooling medium.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a control valve as an option at the input/output connections of the flow guide enclosure for the mass adjustment of the flow of the cooling medium, since it has been held that the provision of adjustability, where needed, involves routine skill in the art (see MPEP 2144 (V-D)).

Claim 39 depends on claim 38 such that the reasoning used to reject claim 38 will be used to reject the dependent portions of the claim.

Regarding claim 39, Abe discloses a temperature sensor at the downstream end of the chamber (see figure 6, element 14a-f are the temperature sensors).

Abe does not disclose that the temperature sensor is connected to the control valve for the mass adjustment of the flow of the cooling medium via an upstream control unit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the control valve for the mass adjustment of the flow of the cooling medium via an upstream control unit, since it has been held that the provision of adjustability, where needed, involves routine skill in the art (see MPEP 2144 (V-D)).

Claim 40 depends on claim 22 such that the reasoning used to reject claim 22 will be used to reject the dependent portions of the claim.

Regarding claim 40, Abe teaches an additional cooling medium channel is arranged in the interior of the hollow cylindrically embodied conversion stages, through which preferably and optionally water and/or the hydrocarbons can flow (see page 7, lines 20-33 and figure 9).

Response to Arguments

Applicant's arguments with respect to claims 22-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATASHA YOUNG whose telephone number is (571)270-3163. The examiner can normally be reached on Mon-Thurs 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NY

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797